Environmental Services Ireland

Legionella Risk Assessment

gemwater

28-32 O'Connell Street Upper,

Rotunda,

Dublin 1,

D01 T2X2

ESI Reference No: J29167

Date: 09/10/2023

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Certificate of Completion

Customer: **Holiday Inn Express**

Site Address: **28-32, O'Connell Street Upper, Rotunda, Dublin 1, D01 T2X2**

Date: **09/10/2023**

Assessment Reference: ESI_J29167

Risk Assessor: David Forde

Revision No.: N/A

Review Due: 2025

The risk assessment should be reviewed on an annual basis to verify the accuracy of the information and the status of the recommendations. The assessment should be completely reviewed (at least every 2 years) and, wherever there is reason to believe that the original assessment may no longer be valid.

Customer Representative Signature: _____

1.0 Introduction

1.1 General Introduction

Legionnaires' disease is a potentially fatal form of pneumonia. The causative agent of this illness is *Legionella pneumophila.* Legionella bacteria can also cause other, less serious, illnesses such as Pontiac fever and Lochgoilhead fever. Legionellosis is the collective term used to describe the group of diseases caused by legionella bacteria. Legionellosis is contracted by inhaling the bacteria in aerosols (water droplets), from contaminated systems. Engineered water systems very often create suitable conditions for the growth and proliferation of bacteria such as *Legionella* and a risk assessment is conducted to identify and document all potential sources of risk and make recommendations to manage the risk.

Environmental Services Ireland has completed this Risk Assessment in accordance with Health Protection Surveillance Centre*,* ***National Guidelines for the Control of Legionellosis in Ireland, 2009*** *and the UK* Health & Safety Commission recommendations contained within the document ***'Legionnaires' disease - The control of legionella bacteria in water systems - Approved code of practice & guidance' (L8).*** These documents are widely recognised as containing the most comprehensive guidelines for safe management of risk systems and compliance is considered to be best-practice.

The objectives of this survey are as follows:

1. To provide documented evidence as to the state of the water systems, control systems and management structure at the time of assessment.

2. To provide guidance and recommendations on how to control and minimise future risk of Legionella proliferation by:

- Identifying and assessing likely sources of risk
- Recommending schemes to help control the risk
- Suggesting a suitable routine monitoring program
- Checking current record keeping procedures
- Clarifying lines of responsibility
- Identifying training deficiencies
- Providing recommendations

1.2 Executive Summary

Environmental Services Ireland have been contracted by Gem Water to carry out a full and comprehensive Legionella Risk Assessment on all water systems at their facility in 28-32, O'Connell Street Upper, Rotunda, Dublin 1, D01 T2X2 and in accordance with the HPSC*, National Guidelines for the Control of Legionellosis in Ireland, 2009 and UK* HSE Approved Code of Practice & Guidance document L8: *the control of legionella bacteria in water systems*.

David Forde of Environmental Services Ireland completed this risk assessment in October 2023. David Forde has completed City & Guilds accredited Legionella Awareness Training and has extensive experience in Legionella Risk Assessment and Legionella Risk Management across all sectors of industry including healthcare, industrial, pharmaceutical and commercial.

Following the condition survey and inspection of records a number of recommendations have been made to upgrade the systems and procedures to control the potential *Legionella* risk.

The Holiday Inn Express is a 200-room hotel located in Dublin City Centre which opened in 2016. It has 6 floors, reception, Bar and Kitchen on the ground floor and bedrooms on floors 1-6.

Council supplied mains enters the site by the basement level -1. Mains water supplies the kitchen services and bar areas on the ground floor. A 27m3 split tank is located in the plantroom level -1. This provides cold water (CWS) throughout the site and the Calorifiers located in the plantroom level -1 supply the hot water (DHWS) throughout the site. Each room has a toilet, showers, and wash hand basin.

Infrequently used outlets must be in a program of regular flushing. Changes in building and system use must regularly reviewed, particularly when considering the effectiveness of the frequency and duration of the flushing program that is implemented to counteract any potential stagnation in the system. Changes in use and occupancy as a result of the Covid-19 restrictions may mean that flushing for longer periods and significantly more frequently may be required. The system water quality, and effectiveness of the control measures, should be under regular monitoring with *Legionella* sampling, particularly during periods of significant change. Chemical disinfection of the system will be required prior to recommissioning of the systems following any long-term period of low usage

To ensure the water systems remain free of high numbers of *Legionella* and to prevent colonisation they must be operated in accordance with HPSC*, Legionella Guidelines 2009.* The recommendations of this risk assessment must be completed and a compliant monitoring and sampling program should be put in place for the site. All infrequently used outlets must be flushed regularly and the water temperatures must achieve the required standards. Site should ensure that all required control measures are in place and that all recommendations are completed to ensure that the risk from all systems is controlled.

Disclaimer

Although every care is taken to detect all relevant pipe work and systems on site, it is possible that some elements may have remained hidden from inspection (e.g. underground or roof space pipework dead legs).

Whilst the relevant systems on site have been inspected for their suitability, it is often not possible to identify the source of individual parts. Use of the *'Water Fittings and Materials Directory'*, published by the Water Research Centre, will help to ensure that any components acquired in future comply with relevant regulations.

Since supply water quality, weather conditions and several other factors will vary over the course of time and as a result of seasonal changes, the findings of this study and resultant recommendations should be taken in the context of the current situation. Future conditions may lead to the establishment of significantly different risk levels.

Neither Environmental Services Ireland nor its representatives are qualified to offer any medical opinion regarding *Legionella* based diseases or the likely effects of any particular level of bacteria on site.

1.3 Scope of Assessment & Exclusions

28-32, O'Connell Street Upper, Rotunda, Dublin 1, D01 T2X2– Approximate location highlighted.

Description:

The Holiday Inn is located at 28-32, O'Connell Street Upper, Rotunda, Dublin 1, D01 T2X2. The surrounding areas mainly comprise of residential properties, with a minority being commercial properties.

Any potential risk system should be managed to ensure that no risk is created to the personnel on site, workers on adjacent sites or members of the public.

Scope:

This risk assessment covers all water systems at the above highlighted site.

Exclusions:

No exclusion to this survey. The aim of the survey is to assess all water systems on site.

1.4 Risk Assessment – Risk Systems Rating

This risk assessment has categorised the water systems on site according to an evaluation of potential risk. The potential risk is based on the significant factors which influence growth of *Legionella* in water systems. The potential risk is outlined for each risk system individually and determined using the following table of significant factors:

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	✓
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	✓
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	✓
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	✓

The potential risk classification is dependent on whether some or all of the factors above are applicable to the system. Water systems are classed as high, medium or low which represents the potential risk from the system, giving consideration to the hazards, if the system is operated without any controls.

High Risk – A system is categorised as being a potentially high risk system where all of the risk factors above (1 – 5) apply. A high risk system will allow the growth and proliferation of Legionella bacteria if the appropriate operating conditions are not maintained.

Medium Risk - A system is categorised as being a potentially medium risk system where some of the factors above are mitigated. This would for example include where a limited aerosol is produced and exposure to the aerosol is unlikely, or where the system are above or below the guideline limits for control as outlined in 2 above.

Low Risk - A system is categorised as being a potentially low risk system where, under normal operating conditions, some of the factors above do not occur. This would for example include a water system where no aerosol release occurs, or temperatures operate at >70°C or the system is supplied from a treated water source where bacteria are completely removed.

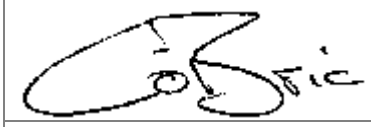
The categorisation of risk is based on the evaluation of the risk assessor following the site survey and all available information.

The classification of potential risk is outlined to give an overview of the water Regardless of classification all systems which have a potential Legionella Risk must be operated in accordance with the HPSC*, National Guidelines for the Control of Legionellosis in Ireland, 2009 and UK* HSE Approved Code of Practise & Guidance document L8: *the control of legionella bacteria in water systems*.

1.5 Risk Assessment Handover

This assessment has identified risk systems on site. Section 4 of this assessment gives a detailed breakdown of specific recommendations and requirements, which should be completed by the customer to ensure all risk systems meet a standard of compliance with HPSC*, National Guidelines for the Control of Legionellosis in Ireland, 2009 and* ACOP, L8.

Environmental Services Ireland has provided an independent assessment to this customer, and has highlighted the requirements and recommendations to control the risk from Legionella. It is the responsibility of the customer to ensure the full implementation of all remedial work and recommendations on site.

Checked and Authorised By ESI Management: 	Customer Signature
Date: 29/10/23	Date:

This risk assessment should be reviewed regularly (at least annually) and, whenever there is a reason to suspect that it is no longer valid. The reason for review of the assessment and what needs to be reviewed should be recorded. A review will be required in the case of the following occurrences:

- changes to the water system or its use;
- changes to the use of the building in which the water system is installed;
- the availability of new information about risks or control measures;
- the results of checks indicating that control measures are no longer effective;
- a case of Legionnaires' disease/legionellosis is associated with the system.

HPSC*, Legionella Guidelines 2009, Chapter 4.2.5* & ACOP, L8 Par. 38.

2.0 Roles & Responsibilities

2.1 Lines of Communication & Responsibilities

HPSC*, Legionella* Guidelines 2009, Chapter *5* and Paragraphs 39 - 45 of ACOP L8 highlight the requirement for identified lines of communication and a clear structure of responsibility, which should be put in place to ensure competent management of the risk management program.

Duty Holder: The person on whom the statutory duty falls. The duty holder has overall responsibility for the Legionella program and should appoint a responsible person to supervise the day to day running of all Legionella related issues (HPSC*, Legionella Guidelines 2009, Chapter 5 & ACOP L8, Para 39)*.	
Name	TBC
Position	
Telephone Number	
Mobile Number	
E-mail address	

Responsible Person: Appointed by the statutory duty holder. The responsible person is charged with responsibility for implementing the risk assessment recommendations and the Legionella risk management program. The responsible person reports to the duty holder.	
Name	TBC
Position	
Telephone Number	
Mobile Number	
E-mail address	

Deputy Responsible Person: Appointed by the statutory duty holder or responsible person. The deputy responsible person is charged with responsibility for implementing the risk assessment recommendations and the Legionella risk management program in the absence of the responsible person.	
Name	TBC
Position	
Telephone Number	
Mobile Number	
E-mail address	

Site Contact: Appointed by the responsible person. Point of contact between site and water treatment specialists / consultants. Involved in the day to day running of the risk management program. Person nominated by site to give assistance and information on day of survey.	
Name	TBC
Position	
Telephone Number	
Mobile Number	
E-mail address	

External Contractors

Water Hygiene Consultants: Appointed by the duty holder/water treatment company to complete the Legionella risk assessment on site. The water hygiene consultant provides information on current legislation and industry best practice in relation to Legionella. May also be required by site to implement management programmes, provide chemical dosing programmes and technical support.	
Company Name	Environmental Services Ireland
Contact 1	David Forde
Position	Surveyor
Telephone Number	01 8807018
Mobile Number	085 252 7931
E-mail address	david@esire.ie

2.2 Additional Responsibilities

With focus specifically on the *Legionella pneumophila* risk management program, this section deals with (i) identification of management responsibilities for the upper hierarchy of the Risk Management Organisation, as well as (ii) activities or tasks that are divided between management, operational staff and service provider

Responsibilities for Upper Hierarchy of Risk Management Organisation

Duty Holder - Person on Whom Statutory Duty Falls

Ensuring that a Risk Assessment of all systems has been carried out and the recommendations implemented (HPSC*, Legionella* Guidelines 2009, Chapter *4,* ACoP L8, Par. 23)

Designating the responsible person and his/her deputy, to take day to day responsibility for controlling any identified risk from *Legionella* bacteria (HPSC*, Legionella* Guidelines 2009, Chapter *5,* ACoP L8, Par. 39, 44)

Ensuring that the responsible person is fulfilling his/her duties as defined. (HPSC*, Legionella* Guidelines 2009, Chapter *5,* ACoP L8, Par. 42, 43, 44)

Providing all necessary resource and support to maintain the water systems to the HSE standards without delay and ensuring that control procedures are carried out to the standards required to minimise the proliferation of *Legionella* bacteria (HPSC*, Legionella* Guidelines 2009, Chapter *5,* ACoP L8, Par. 50)

Reporting cases of legionellosis to HSE (ACoP L8, Par 15, appendix. 2.1 & 2.2)

Responsible Person

This person should be a Manager, Director or have similar status and sufficient authority, competence and knowledge of the installation to ensure that all operational procedures are carried out in a timely, effective manner. Responsibilities specified by L8 include:

Ensuring that he/she has a clear understanding of his/her duties and the overall health and safety management structure and policy in the organisation (ACoP L8, Par. 44, 45, 48).

Consulting with employees or their representatives on the identified risks of exposure to legionella bacteria and on the measures and actions taken to control the risks (ACoP L8, Par. 36).

Initiating a review of the Risk Assessment of water systems, whenever there is reason to suspect it may no longer be valid and in any event, at least every two years (ACoP L8, Par. 38).

Attending regular review meetings with persons involved in carrying out the written scheme (ACoP L8, Par. 42, 43, 61).

Maintaining a record of training (ACoP L8, Par. 45).

Ensuring that staff appointed to carry out agreed Control Measures have been adequately trained, are competent and have appropriate tools and equipment to carry out the tasks (ACoP L8, Par. 45).

Reviewing management and communication procedures
(ACoP L8, Par. 46, 70).

Ensuring that there are adequate staff resources available to carry out agreed Control Measures and all Maintenance Operations, inspections, checks and remedial actions (ACoP L8, Par. 47).

Ensuring preparation of a written statement and scheme to minimise the risk of legionella (ACoP L8, Par. 53, 55).

Minimising the risk of the proliferation of legionella organisms by means such as appropriate temperature control, effective cleaning & hygiene procedures and the use of an appropriate Water Treatment regime. Regularly checking to ensure that the services are being carried out to L8 guidelines (ACoP L8, Par. 57).

Ensuring that on-site personnel have the appropriate protective clothing and equipment and that adequate health and safety information is available and displayed correctly (ACoP L8, Par. 58).

Checking that all tests, inspections and maintenance carried out are recorded correctly, signed by the appropriate person and that the records are kept in a safe accessible place for audit purposes (ACoP L8, Par. 61 - 69).

Monitoring effectiveness of the control measures in place and making decisions on the frequency and manner of monitoring (ACoP L8, Par. 69).

Ensuring that records are kept of the precautions taken and the results of checks carried out (ACoP L8, Par. 66 - 69).

Ensuring initiation and correct completion of water systems visit log record (ACoP L8, Par. 69).

3.0 Training, Management & Monitoring Systems

3.1 Training

The training matrix table indicates the level of training required for staff involved in the control scheme. The requirements for training are outlined in Chapter 7, Table 12 of the *Health Protection Surveillance Centre document, National Guidelines for the Control of Legionellosis in Ireland, 2009.*

Training Description	Statutory Duty Holder	Responsible person	Deputy Responsible person
Legionella General Awareness	✓	✓	✓
Legionella Legislation	✓	✓	✓
Risk assessment: general principles	✓	✓	✓
Water Management: general principles	✓	✓	✓
Record keeping	✓	✓	✓
Data interpretation and reporting	✓	✓	✓
Training and competence	✓	✓	✓
Program monitoring and review	✓	✓	✓
Contract management	✓	✓	✓
Water treatment principles		✓	✓
Cleaning and disinfection principles		✓	✓
Sampling and on-site testing principles		✓	✓
Plant and equipment maintenance		✓	✓
Cleaning and disinfection practice			
Sampling and on-site testing practice			
Training Satisfactory	Undetermined	Undetermined	Undetermined

Training of site personnel comments / recommendations:

1. Provide training for relevant site personnel in accordance with HPSC Legionella guidelines.

3.2 Control Scheme Evaluation

Risk System Monitoring – Domestic Water Systems	Recommended Interval	Currently carried out on site at recommended interval Yes / No / N/A
Flush dead legs and infrequently used outlets	Weekly	Yes
Measure temperature of Sentinel outlets cold/hot	Monthly	Yes
Measure temperature of calorifier outlet and return	Monthly	*BMS
Check operation of secondary return pumps	Monthly	*BMS
Descale clean and disinfect shower heads	3 Monthly	**No
Measure temperature of incoming main and storage tanks	6 Monthly	No Records observed
Legionella sampling	6 Monthly	No Records observed
Measure temperature of representative selected outlets	Annual	Yes
Inspect CWST and installation	Annual	Yes
Flush calorifier drain to indicate internal condition	Annual	No Records observed
Inspect Calorifier and installation	Annual	No Records observed
Measure cold water storage tank consumption to ensure turnover in 24 hours.	Annual	No Records observed
Servicing of TMVs	Annual	No Records observed
Check operation and usage to all fittings including internal and external connections, kitchens, fire systems, chemical wash systems.	Annual	No Records observed
Responsible person review risk assessment and control scheme	Annual	No Records observed
Review risk assessment	Every 2 Years	Yes
Clean and disinfect storage tank	If required	Yes
Disinfect hot and cold system (Remedial Action)	If required	If required
Clean and disinfect calorifier (Remedial Action)	If required	If required
Legionella tests	If required	If required
Review results	If required	If required
Review and update management structure	If required	If required

Risk System Monitoring – Air Handling Units	Recommended Interval	Currently carried out on site at recommended interval Yes / No / N/A
Internal inspection	Quarterly	If required

Recommendations

1. Where this survey has found that an item is not completed or completed at an inadequate frequency site should implement remedial action to ensure the appropriate checks and tests are completed to ensure an adequate system of control, as recommended by the HPSC*, Legionella* Guidelines 2009 & ACoP L8, is put in place**.**

***** Site currently use temperature BMS attached to calorifier pipework to record monthly temperatures. To ensure compliance BMS probes should be calibrated, all records retained for 5 years and all faults actioned. A calibrated thermometer should be used on all monitoring works.

****** Site cleaners currently flush and clean the showers. This is an external clean and not a clean and descale.

3.3 Site Documentation Review

Risk Assessment

1.	Is there a previous risk assessment?	Yes
2.	Have all risk assessment recommendations been completed and signed off?	No
3.	Is there a written scheme for controlling the risk from exposure to *Legionella* bacteria?	*No Records observed
4.	Does the scheme contain the parameters for system operation, and details of the checks (and their frequency) that are to be carried out?	No
5.	Is there an up to date, detailed and accurate schematic?	TBC
6.	Is the cold-water storage temperature <20°C throughout the year?	*No Records observed
7.	Is the calorifier(s) maintaining the appropriate temperatures throughout the year?	*No Records observed
8.	Are the system cold water temperatures within the appropriate parameters throughout the year?	**Yes
9.	Are the system hot water temperatures within the appropriate parameters throughout the year?	**Yes
10.	Are there procedures in place to bring standby equipment into routine use?	TBC
11.	Is there a flushing program in place?	No Records observed
12.	Has the flushing program been audited by the responsible person?	No Records observed
13.	Are the TMVs on the system identified?	Yes
14.	Have the TMVs been serviced appropriately (methodology, frequency)?	*No records observed
15.	Is there a water treatment program in place?	No
16.	Are biocides used as a method of control?	No
17.	Is temperature used as a control method?	Yes

Monitoring

18.	Are all temperature checks completed at the required interval?	*No Records observed
19.	Are biocide residual concentrations monitored at the appropriate interval?	N/A
20.	Do the monitoring records reflect the requirements outlined in the written scheme?	*No Records observed
21.	Are faults / recommendations documented and actioned?	*No records observed

*** Site have informed the surveyor that monitoring records are retained by Quinn Downes Services - there was no records observed on the day of the assessment except for a tank cleaning record. It is the responsibility of the client to retain records available for inspection.**

**** Holiday Inn maintenance staff carry out weekly temperature checks.**

Comments / Recommendations:

Monitoring records observed for Site Temperatures. This report has made several recommendations which should be implemented soon as possible.

1. Monitoring logs should be specific for sentinel outlets on monthly basis and the locations typed in the log to ensure consistent monitoring of locations.

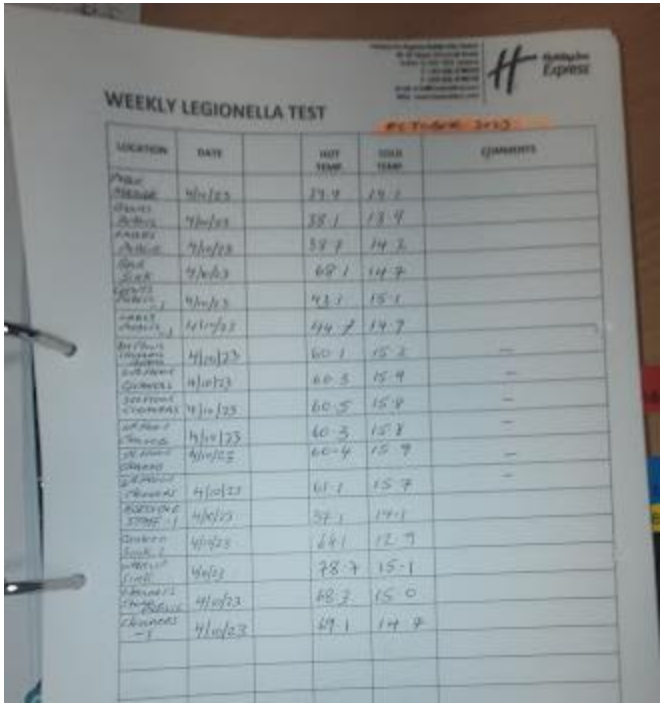
2. Where a Fault/remedial action is recorded a follow up documentation should be in place, such as a faults log, to describe the fault and document the completion of remedial works.

3. Logbooks should be on site and held for up to 5 years and be given for inspection on request.

4. A written control scheme should be implemented. A site logbook should include all relevant documentation as described in sections '3' & '4.2' of this report.

5. Lines of communication and roles and responsibility should be established in accordance with HPSC, Legionella Guidelines 2009, Chapter 5 and Paragraphs 39 – 45 of ACOP L8 highlight the requirement for identified lines of communication and a clear structure of responsibility, which should be put in place to ensure competent management of the risk management program.

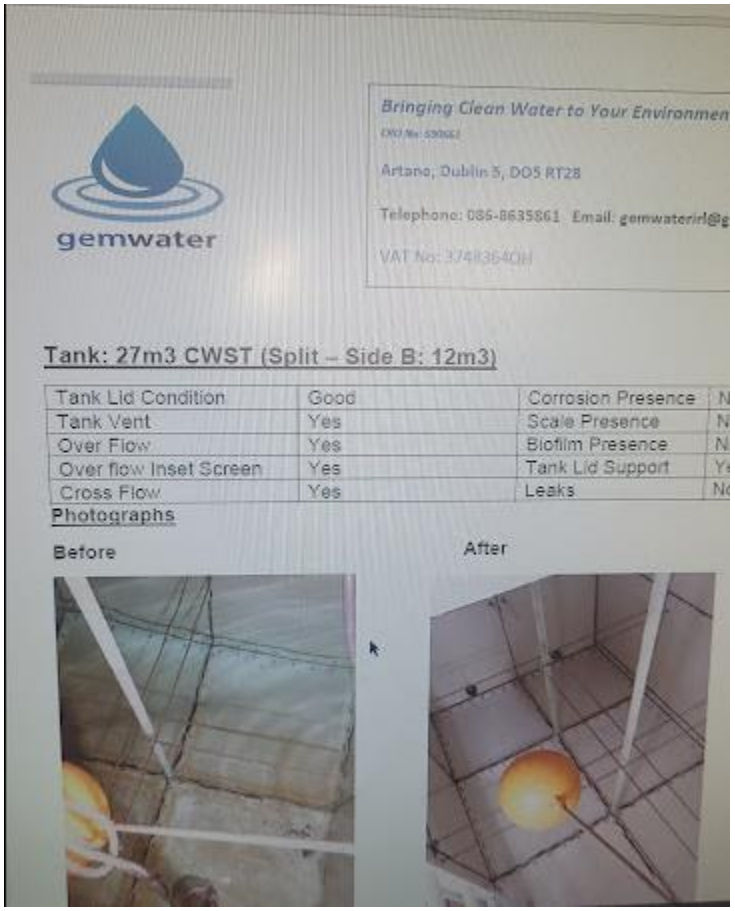
6. Site have implemented a weekly flushing programme and monthly monitoring scheme site need to clearly document actions and responses to temperature that are outside the recommended guidelines.



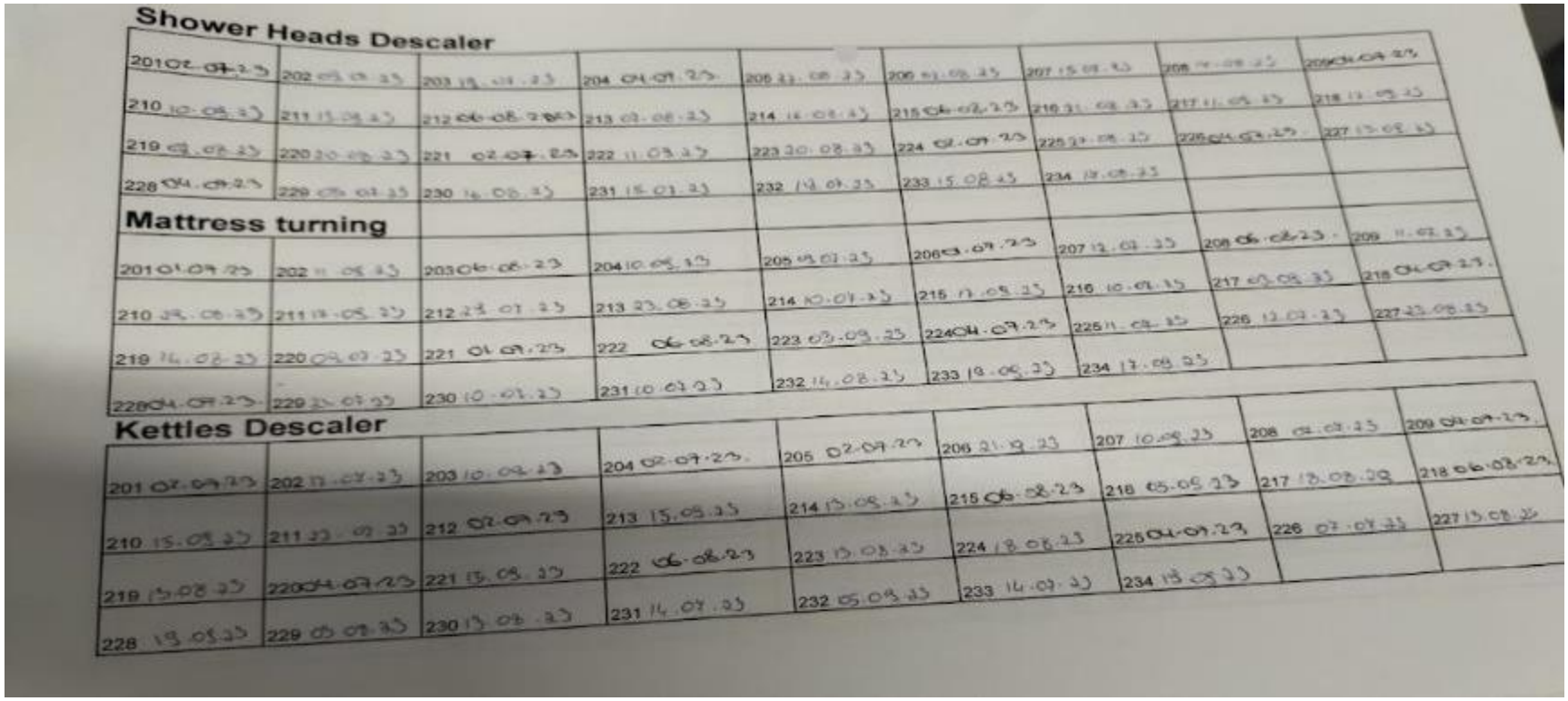
Temperature Records for October 2023

The temperature log must have parameters listed. The logs currently record temperatures which are not satisfactory from a Legionella control monitoring standpoint. Where a Fault/remedial action is recorded, follow up documentation should be in place, such as a faults log, to describe the fault and document the completion of remedial works.

Where a TMV is fitted the hot and cold fed to the TMV should be recorded to demonstrate that the hot and cold fed to the outlet is satisfactory.



Tank cleaning record 2023



Shower head descaling- 2023

1. The log should be available for quarterly cleaning/descaling as required by the guidelines. The log should refer to a written procedure that is utilised for the process undertaken. Flushing and cleaning of showers heads is not considered cleaning and does not include disinfection of hoses.

2. Shower record should be asset listed to show the location of the shower with date/time recorded in the log. All monitoring records should be held within a site-specific water logbook.

4.0 Survey Findings

4.1 Recommended Corrective Actions

The recommendations of the risk assessment are itemised below. These recommendations should be continuously reviewed and the completion of a remedial action plan monitored by the responsible person. A signed record of the completion of all recommendations made in the Legionella Risk Assessment should be maintained.

Priority Rating Key:
1. Immediate review and plan of remedial action required.
2. Review and remedial action within 3 months.
3. Implement within 6 months to ensure compliance with HPSC / ACOP L8 guidelines.
4. Implement within 12 months to ensure compliance with HPSC / ACOP L8 guidelines.

Item	System	Recommendation	Priority
1	Risk Management Procedures	The monitoring and sampling scheme should meet the requirements of the HPSC guidelines. The risk management control scheme should cover all elements outlined in Section 4.2 of this report **(HPSC*, Legionella Guidelines 2009, Chapter 7 &* ACOP, L8 Par. 66 & 67)**.	**1**
2	Risk Management Procedures	The responsible person should review the monitoring program records against the planned written scheme on a regular basis to ensure all tasks are completed and all documentation is up to date.	**1**
3	Risk Management Procedures	The flushing procedure and record system for the domestic water systems should ensure that all potentially infrequently used outlets are flushed regularly. Where sinks have low usage or limited staff numbers, this increases the stagnation potential in the system and flushing must counteract this potential.	**1**
4	Risk Management Procedures	Provide training for relevant site personnel in accordance with HPSC Legionella guidelines	**1**

Item	System	Recommendation	Priority
5	Domestic Water Distribution	Dead end pipework should be removed. All dead legs and bypass pipework should be flushed through on a weekly basis.	**1**

Item	System	Recommendation	Priority
6	CAL 1	Calorifiers should operate at >60°C at all times and if present, the return hot water temperature must be >50°C. All outlets within the buildings and all distribution pipework must have a hot water temperature of >50°C within one minute of flushing.	**1**

Item	System	Recommendation	Priority
7	Domestic Showers	Assess the requirement for and usage of the showers in the building and remove the showers, cutting back all associated pipework where the units are not required	**1**
8	Domestic Showers	Clean and disinfect all showerheads on a quarterly basis	**2**

Item	System	Recommendation	Priority
9	TMV's	The TMVs should be maintained and serviced on an annual basis in accordance with manufacturers' operating instructions and guidelines to ensure they are working safely and correctly **(ACOP, L8 Page 42 Par. 170).**	**3**

Item	System	Recommendation	Priority
10	Closed Water Filler Units	Considering the mains water supply to the closed systems is considered a dead leg it should be isolated from the mains water system by fitting a double check valve as close to the branch off the running main as possible	**3**

Item	System	Recommendation	Priority
11	Air Handling Units	The air-handling units should be inspected regularly and maintained quarterly or more frequently if required by manufactures guidelines. Inspections should assess the following: - dirt level of internal surfaces (including fins) - condensate trays (no standing water, dirt or corrosion) - drains (free flowing and clear of blockages). A record of all inspections should be maintained in a site logbook and all recommendations completed and signed off by the responsible person on site	**2**

Item	System	Recommendation	Priority
12	Sampling for Legionella	Testing for *Legionella* species bacteria should be completed on at least a six monthly basis from all units in accordance with HPSC guidelines. Legionella sampling should also include outlets producing significant aerosol such as showers. All remedial work recommended in this risk assessment should be completed and sampling completed to verify its effectiveness. Legionella sampling is also required where the systems fail to achieve the required control parameters e.g. poor water temperatures, incomplete flushing.	**3**

Environmental Services Ireland (ESI) conducted this risk assessment. Whilst every effort has been made to ensure that the assessment has been as comprehensive as possible, it should be recognised that it is impossible to guarantee that every system has been identified and so no liability can be accepted for omissions from this report. Diligence should be maintained in regarding the potential risk of all water systems and if a system is identified which has a potential for harbouring *Legionella* bacteria, for which no precautions are currently detailed, then ESI should be contacted with a view to advising on the implementation of suitable procedures and updating the risk assessment.

4.2 Recommended Control Measures

Risk System Monitoring – Domestic Water Systems	Recommended Minimum Interval
Flush dead legs and infrequently used outlets	Weekly
Measure temperature of Sentinel outlets cold/hot	Monthly
Measure temperature of calorifier outlet and return	Monthly
Check operation of secondary return pumps	Monthly
Descale clean and disinfect shower heads	3 Monthly
Temperature monitoring of water heaters	3 Monthly
Measure temperature of incoming main and storage tanks	6 Monthly
Inspect CWST and installation	6 Monthly
Legionella sampling	6 Monthly
Measure temperature of representative selected outlets	Annual
Flush calorifier drain to indicate internal condition	Annual
Inspect Calorifier and installation	Annual
Responsible person review of risk assessment and control scheme documentation	Annual
Measure cold water storage tank consumption to ensure turnover in 24 hours.	Annual
Servicing of TMVs	Annual
Check operation and usage to all fittings including internal and external connections, kitchens, fire systems, chemical wash systems.	Annual
Review risk assessment	Every 2 Years
Clean and disinfect storage tank	If required
Disinfect hot and cold system (Remedial Action)	If required
Clean and disinfect calorifier (Remedial Action)	If required
Legionella tests	If required
Review results	If required
Review and update management structure	If required

5.0 Risk Assessment Condition Survey

5.0 Asset Condition Survey

5.1 Asset register – Risk Systems

Cold Water Storage Tanks

Asset Number / Description	Location	Supplied From	Supplying
CWST	-1 Basement Plantroom	MCWS	CWS

Calorifiers

Asset Number / Description	Location	Supplied From	Supplying
CAL 1-4	-1 Basement Plantroom	CWS	DHWS

Domestic Showers

Location	Approximate number of showers	Supplied From	Type
SITE WIDE	198	CWST/CAL	MIXER

Other Water Systems

Asset Number / Description
Utility Wash Taps / Wash Hoses
Heating Water Systems
Hot Water / Drinks Dispenser
Dishwasher
Washing Machines
Air Conditioning – Single Zone
Air Handling Units
Water to Closed Systems

5.2 Mains & Domestic Hot & Cold Water Systems

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	✓
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	✓
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	✓
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	✓
Potential Risk	**High**	

5.2.1 Mains Water Systems

Installation	
Mains Supply Source	Council Mains
Operation	
Mains Water Temperature	17.1

Recommendations

1. The temperature of the mains water supply should be measured on a six monthly basis (once in the summer and once in the winter) **(HPSC*, Legionella Guidelines 2009, Chapter 5,* ACOP, L8 Page 43 Table 3)**.

5.2.2 Cold Water Storage Systems

The installation and operation of the cold water storage tanks is assessed with reference to the guidelines in the Health Protection Surveillance Centre, *National Guidelines for the Control of Legionellosis in Ireland, 2009; UK HSE* document L8 – *Legionnaires Disease, The control of legionella bacteria in water systems: Approved Code of Practice and Guidance;* The Water Supply (Water Fittings) Regulations (NI) 2009 and BS 8558: 2011- Design, installation testing and maintenance of services supplying water for domestic use within building and their curtilages.

In general the principal standards required for cold water storage tanks include the following:

- **Requirement for cold water storage – can the hazard be removed?**
- **Tank constructed of suitable materials**
- **No corrosion in the cold water storage tank**
- **Clean cold water storage tanks**
- **No stagnation and suitable storage volume (24 hours maximum)**
- **Suitable lid and screened lid vent**
- **Screened overflow pipe**
- **Inlet and outlet installed to promote crossflow of water**
- **No vent pipe terminating over the cold water storage tank**
- **Tank and associated pipework insulated**
- **Stored water temperature ≤2°C over the incoming mains water**

Recommendations are made where the tanks do not meet the required standards of installation and operation.

Asset Number / Description	MWST	**Location**	BASEMENT
Can the hazard be removed	No	**Serving**	CWS

Installation Details	
Materials of Construction	GRP
Capacity	27,000 Litres

Installation Standards	**Yes**	**No**	**Comment / Recommendation**
Compliant with outlined standards	✓		

Image 01: External View

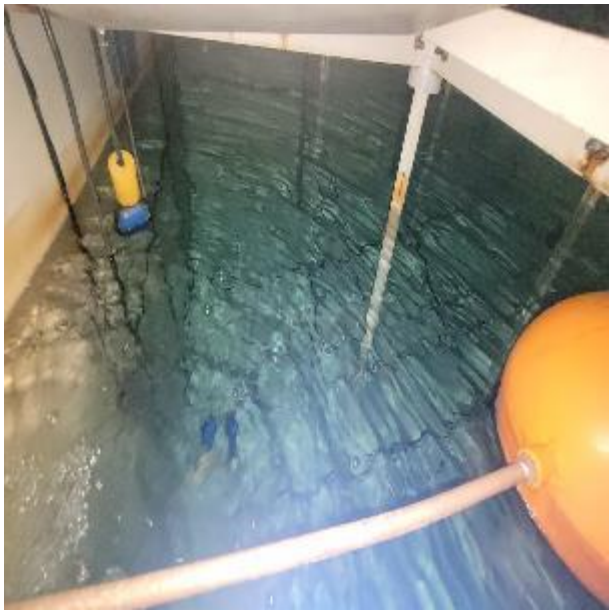


Image 02: CWST Internal View

Operation	
Internal Cleanliness:	Good
Stagnation Evident	No

Recommendations: Monitored the incoming and stored water temperature on a 6 monthly basis.

5.2.3 Hot Water Storage & Distribution

The installation and operation of the calorifiers is assessed with reference to the guidelines in the Health Protection Surveillance Centre*, National Guidelines for the Control of Legionellosis in Ireland, 2009; UK H*SE document L8 – *Legionnaires Disease, The control of legionella bacteria in water systems: Approved Code of Practice and Guidance;* The Water Supply (Water Fittings) Regulations (NI) 2009 and BS 8558: 2011- Design, installation testing and maintenance of services supplying water for domestic use within building and their cartilages.

In general the principal standards required for hot water storage calorifiers include the following:

- **Requirement for hot water storage – can the hazard be removed?**
- **Calorifier constructed of suitable materials**
- **Calorifier and associated pipework insulated**
- **No significant stored water stratification across the cylinder**
- **Stored water temperature >60°C**
- **Secondary hot water return temperature >50°C**
- **Secondary hot water return pump operating**
- **Inspection hatch or functioning drain**

Recommendations are made where the calorifiers do not meet the required standards of installation and operation.

Asset Number / Description	CAL 1-4	**Location**	Basement Plantroom
Can the hazard be removed	No	**Serving**	DHWS

Installation Details		
Capacity	650 LTR EACH	
Operation		
Return Pump Working	Yes	
Stored Water	**Flow Temperature**	**Return Temperature**
65°C	65°C	55°C

Image 03: Calorifier

Installation Standards	Yes	No	Comment / Recommendation
Compliant with outlined standards	✓		

Recommendations

1. The calorifiers should operate at ≥60°C at all times and if present, the return hot water temperature must be ≥50°C. All outlets within the buildings and all distribution pipework must have a hot water temperature of >50°C within one minute of flushing.

5.2.5 Domestic Showers

Asset Number / Description	SH 1 –SH200 approx.	Can the hazard be removed	No
Supplied From:	CWS-CAL		

Operation	
Usage	Frequently
Condition of Shower Heads	Good

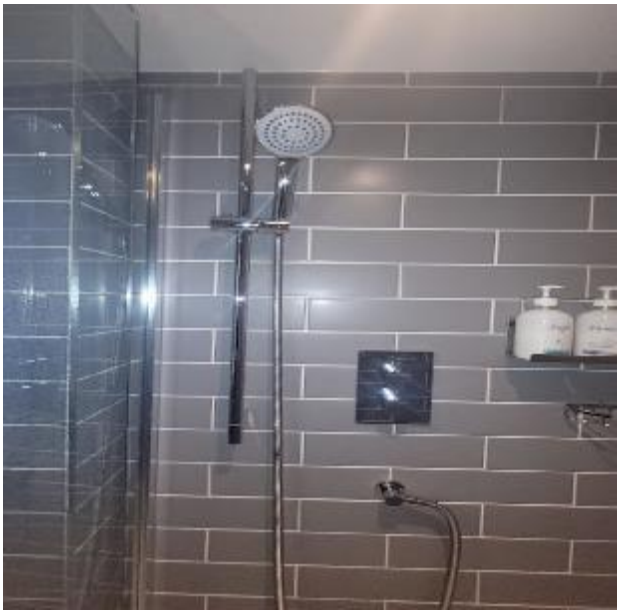


Image 04: Shower on Site

Image 05: Condition of Shower Head

Recommendations

1. Assess the requirement for and usage of the showers in the building and remove the showers, cutting back all associated pipework where the units are not required.
2. Where showers are required but not in regular use they should be flushed thoroughly on a weekly basis to prevent stagnation.
3. Clean and disinfect all showerheads on a quarterly basis.

5.2.6 Distribution System Dead legs, Dead ends & Infrequently Used Outlets

Definitions:

A dead leg is a length of pipework leading to a fitting where the water contained in this pipework lies static for a period of one week or more (this water may become stagnant and aid in the proliferation of Legionella and back contaminate the original water source).

A dead end is a length of pipework where the end has been capped off. This creates and area for sediment and water to stagnate (this water may aid in the proliferation of Legionella and back contaminate the original water source).

Infrequently used outlets are those that are not used at least once per week for a suitable period of time that will ensure a thorough flush through of water preventing stagnation in the system.

The following are the dead ends and dead legs identified during the survey of the buildings. This list is a record of observations and may not be complete register of all dead legs and dead ends within the building. Pipework may be obscured from the view of the surveyor, located in walls or ceilings or located in attics and not easily identified. Where pipework is identified as dead or not required then it should be remediated in a similar manner to the actions recommended below.

Location	Description	Image Number	Recommendation
Basement	Potential dead leg on the mains bypass	6	Flush weekly and document the action
Basement	Dead legs above old Calorifier	7	Remove and cut back to main live source if no longer required

Recommendations

1. If the outlets are not required, they should be decommissioned with all pipework being cut back to the main distribution headers to eliminate any further dead legs within the system.

2. Dead end pipework should be removed. All dead legs and bypass pipework should be flushed through on a weekly basis.

Image 06

Image 07

5.2.7 Fittings and Materials

Thermostatic Mixing Valves

Thermostatic mixing valves (TMVs) or thermostatic taps are fitted where there is a potential risk of scalding. Generally this should mean locations where those that use the outlets have a physical or age related deficiency which might result in scalding from very hot water. This would include elderly people and young children. In general, able-bodied adults are able to recognize hot water and remove their hands or mix with cold water to prevent scalding.

Thermostatic mixing valves can potentially create a link between hot and cold water systems. They are fitted with check valves to ensure no mixing of these systems occur, but if a check valve fails hot and cold water can mix at the valve and further on into the distribution system which can result in temperatures in the 25°C - 45°C range, therefore creating a *Legionella* risk. TMV's are also fitted with strainers which filter out debris from the distribution systems to protect the delicate valve mechanism. Over time, these strainers can become fouled with debris and biofilm, therefore affecting the performance of the valve. Considering the negative of these valves where they are not operating correctly, it is essential that they are serviced when required and on an annual basis in accordance with the HPSC guidelines.

Installation	
Approximate Number	200-250
Accessible for Servicing	No
Isolation Valves Present	Yes
Installed at Each Outlet	Yes
Furthest Outlet < 2m	Yes

Image 08: Thermostatic Mixing Valve

Recommendations

1. Pipework strainers and the strainers on the TMVs should be checked and cleaned regularly to prevent build up of organic contaminants **(ACOP, L8 Page 41 Par. 163).**

2. The TMVs should be maintained and serviced on an annual basis in accordance with manufacturers' operating instructions and guidelines to ensure they are working safely and correctly **(ACOP, L8 Page 42 Par. 170).**

3. TMV's should not be fitted to serve multiple outlets where the run of blended water exceeds 2 meters **(ACOP L8 Par 152 (h), Model Engineering Specification).** Assess the installation at the cleanroom facilities and consider remedial works where the distance to the point of discharge exceeds 2 meters.

Flexible Hose Connectors

Flexible hoses or EPDM hoses are fitted to the systems on site linking fixtures to the water supplies. Flexible hoses can often be constructed from materials which degrade over time and can promote bacterial growth and proliferation. Where upgrade work is completed to the water systems flexible hoses should not be fitted and copper or approved plastic should be used.

Image 09: Example Flexible pipe attach to a TMV on site.

Comments & Observations

1. Flexible hoses should be removed as part of any maintenance or upgrade plumbing work to the buildings' water systems; and not used where sinks are replaced, renewed or upgraded.

Pipework Strainers

Pipework strainers filter out debris from the distribution systems to protect downstream valves and fittings. Over time, these strainers can become fouled with debris and biofilm. Strainers should be cleaned to prevent the build up of debris and biofilm within the system.

Recommendations

1. Pipework strainers should be checked and cleaned regularly to prevent build up of organic contaminants **(ACOP, L8 Page 41 Par. 163).**

Pipework Insulation

Un-insulated pipework can result in heat loss from the hot water distribution pipework, heat gain within the cold water distribution pipework and heat transfer between pipework. Insulation was not present in a number of areas within the building.

Image 10: Uninsulated pipework on site

Recommendations

1. All pipework should be insulated. Particular priority should be given to pipework located externally, in ducts or plant areas with heating or hot water pipework where heat transfer will result in the warming of cold water distribution systems.

Pressure Vessels

Pressure vessels are installed on the hot and cold water systems. Pressure vessels should be connected to the system pipework using as short a run of pipework as possible and should be commissioned so that there is minimal storage of water in the vessel during normal operation.

Recommendations

1. The supply pipework to the pressure vessels should be fitted with drains to allow the dead legs to be flushed on a weekly basis. There are no drains fitted on the pipework to the vessels on the hot water system.
2. Pressure vessels should be serviced on an annual basis, including inspection, in accordance with manufacturer's guidelines.

Utility Water Taps

Utility water taps are generally used for washing and cleaning purposes. A flushing procedure and itemized list of all wash hose outlets is in place and the outlets which are infrequently used are flushed on a weekly basis.

Image 11: Typical utility Tap on site

Comments & Observations

1. Ensure the utility taps are in regular use. When the taps are not in use the hoses should be disconnected and not remain filled with water.

Other Systems

5.3.1 Heating Water Systems

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	
Potential Risk	**Low**	

Boiler water systems are closed systems which provide water for heating for plant throughout site. These systems are closed systems and may have associated cold water storage tanks which supply a top up of water in the event of a loss from the system or serve to capture any water released in the event of expansion from the system. These systems are classed as low risk due to the fact that, during normal operation, no aerosol is generated and no exposure to the enclosed water occurs. These systems generally operate at a temperature of ≥ 70°C, which will kill any *Legionella* bacteria in the water system.

Image 12: Heating System Boilers

Boiler water systems should be dosed with protection chemicals corrosion inhibitor and scale inhibitor and therefore a health and safety risk assessment should be completed prior to commencement of work to protect the worker from any exposure to the system water. Care should be taken during routine maintenance or repair works to ensure no aerosol is generated.

5.3.2 Dishwashers / Washing Machines

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	
Potential Risk	**Low**	

These systems are considered to be low risk as no aerosol created during normal operation is released. The units are generally in constant use. It should be noted that where a unit is not frequently used this creates a dead leg in the mains water supply and remedial action should be undertaken. Ensure all equipment is maintained in line with manufactures guidelines and operated correctly ensuring lids and doors are securely closed to contain potential aerosol release.

Image 13: Dishwasher

5.3.3 Hot Water Dispensers / Tea & Coffee Machines

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	
Potential Risk	**Low**	

These systems are considered to be low risk as the water is heated >70°C during normal operation. The units are generally supplied by mains water and in constant use. It should be noted that where a unit is not frequently used this creates a dead leg in the mains' water supply and remedial action should be undertaken.

Image 14: Hot water dispenser

Image 15: Coffee Machine on site

5.3.4 Single Zone Air Conditioning

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	
Potential Risk	**Low**	

Single zone air conditioning units are installed throughout the site, principally in office areas. These single zone air conditioning units should be inspected and maintained on a regular basis or as recommended by manufacturer's guidelines. Inspections and servicing of these units should ensure that there is no standing water within the unit and also that the drains are operating effectively.

5.3.5 Water Supply to Closed Systems

Item	Description	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	✓
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	✓
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	
Potential Risk	**Low**	

Closed systems such as heating water systems and chilled water systems are supplied with a mains feed to replenish any water losses from the systems. Water losses from a system in normal operation are exceptional and the mains supply to these systems is therefore considered a dead leg and infrequently used.

Comments / Recommendations

1. Considering the mains water supply to the closed systems is considered a dead leg it should be isolated from the mains water system by fitting a double check valve as close to the branch off the running main as possible.

5.3.6 Ice Machine

Item	Description – Risk Factors	Select where applicable
1	The system is fed from a water source which may contain *Legionella* bacteria.	✓
2	Temperature of the water systems can operate in the range which will support growth of Legionella (≥20°C and ≤50°C)	
3	Aerosol created during normal operation and potential exposure of staff / visitors to the aerosol	
4	Stagnation or limited flow of the water systems can occur which will allow biofilm formation and promote the growth of Legionella	
5	The system has recognised associations with cases or outbreaks of Legionnaire's Disease or has been demonstrated to be a system suitable to the growth of *Legionella* bacteria.	✓
Potential Risk	**Low**	

An ice machine is installed on site in the bar areas. These systems are considered to be low risk as they are mains fed and produce no aerosol. The unit is supplied by mains water and in constant use. Ice machines have been associated with the transmission of waterborne bacteria such as *Listeria* and even *Legionella* in an exceptional circumstance so the machine should be kept clean and maintained in accordance with manufacturer's guidelines. It should be noted that where a unit is not frequently used this creates a dead leg in the mains water supply and remedial action should be undertaken.

Image 16: Ice Machine

6.0 Water System Testing

6.1.1 Outlet Temperature Profiles

Location	Hot Water Temperature °C	Cold Water Temperature °C	Recommendation
Room 617	*55 **46.7	15.1	
Room 613	*55 **47.6	15.1	
Room 514	*56 **48.1	15.2	
Room 518	*56 **47.9	15.8	
Room 408	*56 **46.8	15.7	
Room 413	*56 **46.8	15.7	
Room 304	*56 **47.1	15.9	
Room 319	*56 **47.4	15.9	
Second Floor	64	16	
First Floor Cleaners	60.1	16	

*****Where TMV are fitted Hot and Cold temperatures were taken from the pipework nearest to the outlet.

** TMV Controlled outlet

Comments / Recommendations

1. The hot and cold-water temperatures were satisfactory. Assess the potential causes of poor temperatures and take remedial action to ensure all temperatures achieve the required temperatures **(HPSC*, Legionella Guidelines 2009, Chapter 5,* ACOP, L8 Par. 169)**.

2. Monitor water system temperatures on a monthly basis and maintain records of monthly and annual representative outlet temperatures including any remedial actions recommended.

6.1.2 Testing for *Legionella* Bacteria

Recommendations/Comments

1. Testing for *Legionella* species bacteria should be completed on at least a six monthly basis from all units in accordance with HPSC guidelines.
2. Legionella sampling should also include outlets producing significant aerosol such as showers.
3. All remedial work recommended in this risk assessment should be completed and sampling completed to verify its effectiveness.
4. Legionella sampling is also required where the systems fail to achieve the required control parameters e.g. poor water temperatures, incomplete flushing.
5. The samples taken should be analysed by an independent, UKAS/INAB accredited laboratory.

Detailed hereunder are the actions to be taken in accordance with the guidelines laid down in the HPSC*, Legionella Guidelines 2009, Chapter 5,* and UK HSE document L8 – *Legionnaires Disease, The control of legionella bacteria in water systems: Approved Code of Practice and Guidance.*

Legionella Bacteria (cfu/l)	Action
Not Detected	System Under Control
100 or Less	System Under Control
>100 and up to 1,000	Either (a) If only one or two samples are positive, system should be re-sampled. If similar count is found again, a review should be carried out, to identify any remedial actions. (b) If the majority of samples are positive, the system may be colonized, albeit at a low level, with legionella. Disinfection of the system should be considered but an immediate review of control measures and risk assessment should be carried out to identify any other remedial action required.
More than 1,000	The system should be re-sampled and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including possible disinfection of the system.

**Due to the growth periods of the Legionella organism and time taken for Legionella positives to be detected it is recommended the action should be taken on all Legionella positive samples Serogroup 1 and Serogroup 2-14, and Legionella Species.

7.0 References

The specific legislation that is referred to in this report includes:

1. Health Protection Surveillance Centre*, National Guidelines for the Control of Legionellosis in Ireland, 2009.*

2. The Safety, Health and Welfare at Work Act 2005 (S.I. No. 10 of 2005).

3. The Safety, Health and Welfare at Work (General Applications) Regulations 2007 (S.I. No. 299 of 2007).

4. UK Health & Safety Executive. HSG 274, Legionnaires' disease: Technical guidance. Part1: The control of legionella bacteria in evaporative cooling systems. Part 2: The control of legionella bacteria in hot and cold water systems

5. HSE document L8 – *Legionnaires Disease, The control of legionella bacteria in water systems: Approved Code of Practice and Guidance.*

6. The Control of Substances Hazardous to Health Regulations 1988 (COSHH)

7. The Management of Health & Safety at Work Regulations (Northern Ireland) 2000.

8. S.I. No. 248 - Safety, Health and Welfare at Work (Biological Agents) (Amendment) Regulations, 1998 (Amend S.I. No. 146 of 1994)

9. S.I. No. 278 of 2007 – European Communities (Drinking Water) (No. 2) Regulations 2007.

10. The Water Supply (Water Fittings) Regulations (NI) 2009.

11. Thermostatic Mixing Valves Manufacturers Association (TMVA) Recommended Code of Practice for Safe Water Temperatures

12. BS 8558: 2011- Design, installation testing and maintenance of services supplying water for domestic use within building and their cartilages.

13. Health Technical Memorandum 04-01: The control of Legionella, hygiene, "safe" hot water, cold water and drinking water systems. Part A: Design, installation and testing. Part B: Operational management.

14. Water Management Society Guidance Documents.

15. UK HSE document "Working safely with metalworking fluids – good practice manual" (2002)

16. Health Technical Memorandum 03: Specialised Ventilation for Health Care Premises- Part B Operational management and Performance Verification

8.0 Appendices

Appendix 1 – Abbreviations

Acronyms are used throughout this report and the full description is given here for reference.

ESI	Environmental Services Ireland
HPSC	Health Protection Surveillance Centre
UK HSE:	UK Health and Safety Executive
ACoP L8:	Approved Code of Practice & Guidance L8, published by the Health & Safety Commission; Legionnaires' disease. The control of legionella bacteria in water systems.
COSHH:	Approved Code of Practice published by the Health & Safety Commission; The Control of Substances Hazardous to Health Regulations 1988.
BS 6700:	British Standard 6700: 2006 Specification for the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.
cfu/ml	colony forming units per millilitre
cfu/l	colony forming units per litre
DCW	Domestic Cold Water
CWS	Cold water system
DHW	Domestic Hot Water
HWS	Hot water system
$\mu g/m^3$	micrograms per cubic metre
mg/m^3	milligrammes per cubic metre
ppb	parts per billion
ppm	parts per million
TVC	Total Viable Colonies
CWST	Cold water storage tank
DHCWS	Domestic Hot and Cold Water System
BMS	Building management system
WHB	Wash Hand Basin
WRAS	Water Regulations Advisory Scheme
TMV	Thermostatic Mixing Valves
GRP	Glass Reinforced Plastic
UKAS	United Kingdom Accreditation Service
WH	Water Heater
FWH	Fortic Water Heater
MW	Mains Water
SH	Shower/s
CHW	Chilled Water
LPHW	Low Pressure Hot Water
MSDS	MATERIAL SAFETY DATA SHEETS
NC	Nearest Cold
FC	Furthest Cold
NH	Nearest Hot
FH	Furthest Hot
N/A	Not applicable

Appendix 2 – Additional Certification

Legionella Control Association

Legionella Control Association

A Code of Conduct for Service Providers

Certificate of Registration

This is to certify that the following company has submitted a registration under the Conditions of Compliance as laid out in the LCA's Code of Conduct for Service Providers

Name of Company: **Environmental Services Ireland**

Registration Number: **2011/2192** Certificate valid until: **31st August 2024**

Registration under the following services categories:

(1) Legionella Risk Assessment Services
- 1.1 Hot and Cold Water Systems Risk Assessment
- 1.2 Evaporative Cooling Systems Risk Assessment
- 1.3 Process and Other Systems Risk Assessment
- 1.4 Healthcare Risk Assessment

(2) Water Treatment Services
- 2.1 Hot and Cold Water Systems Water Treatment

(3) Hot and Cold Water Monitoring and Inspection Services

(4) Cleaning and Disinfection Services
- 4.1 Hot and Cold Water Systems Cleaning and Disinfection
- 4.2 Evaporative Cooling Systems Cleaning and Disinfection
- 4.3 Process and Other Systems Cleaning and Disinfection

(6) Training Services

(7) Legionella Monitoring Services
- 7.1 Sampling
- 7.4 Interpretation of Analysis

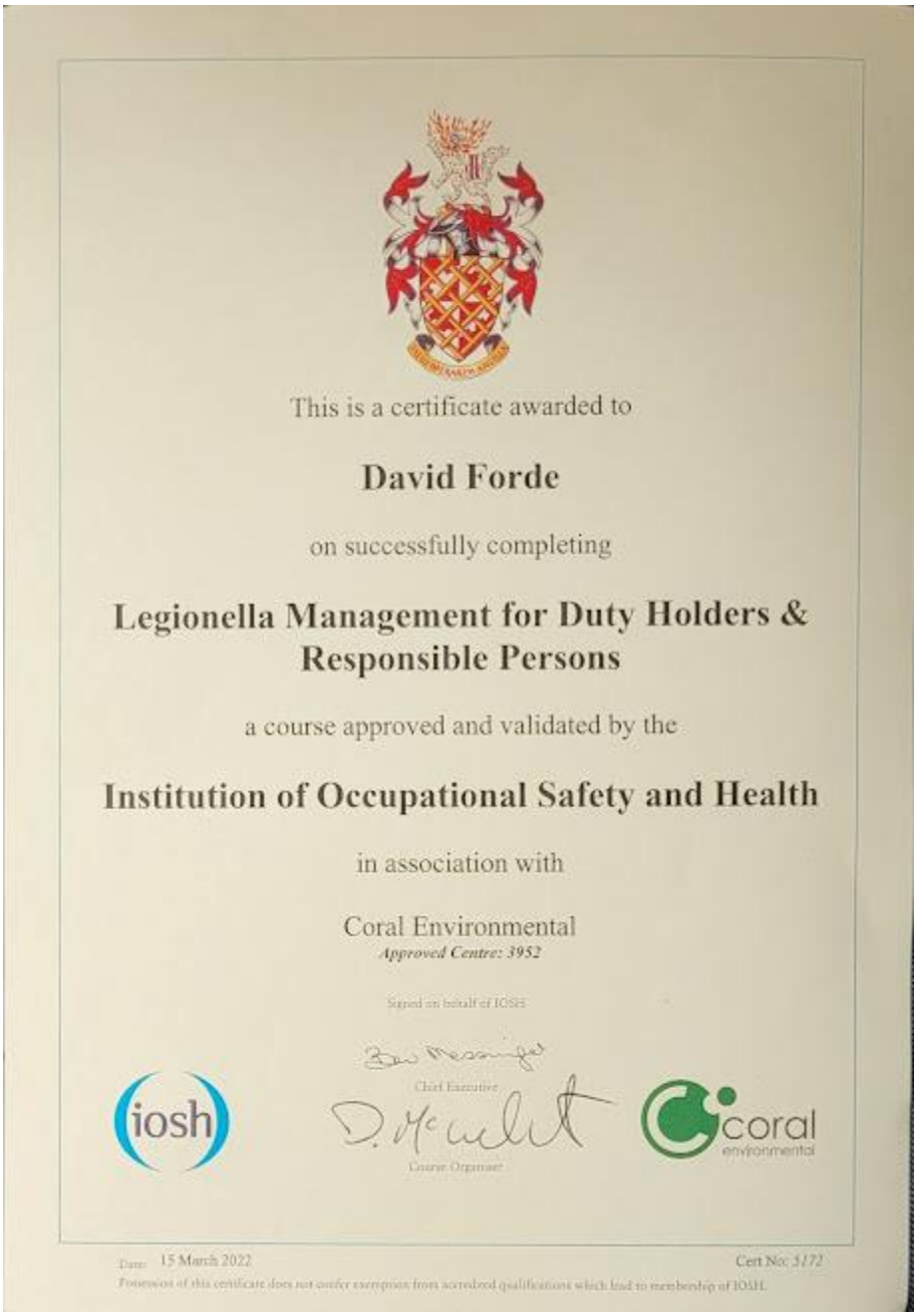
This Certificate is only valid if the Company named is listed on the LCA website www.legionellacontrol.org.uk/directory.php

Signed: Chairman, Executive Committee

Certificate Secretary

Legionella Control Association Limited. www.legionellacontrol.org.uk

Registered in England and Wales No. 3502723



This is a certificate awarded to

David Forde

on successfully completing

Legionella Management for Duty Holders & Responsible Persons

a course approved and validated by the

Institution of Occupational Safety and Health

in association with

Coral Environmental

Approved Centre: 3952

Signed on behalf of IOSH

Chief Executive

Course Organiser

Date: 15 March 2022

Cert No: *5172*

Possession of this certificate does not confer exemption from accredited qualifications which lead to membership of IOSH.

City & Guilds | Accredited Programme

Legionella control

City & Guilds | Accredited Programme

Certificate of Achievement

9950-05 City & Guilds Accredited Training
LC1 – The History of Legionellosis
LC2 – Risk Assessment and Management Control Procedures
LC3 –The Control of Legionella in Hot and Cold Water Systems
15th July 2021

This is to certify that

David Forde

City & Guilds Registered Candidate Number CXR5145

Has successfully completed the above Legionella online courses and passed the final test with an average of 75% and above

For Legionella Control International Ltd
City & Guilds Accredited Centre No. 794931

Signed:

Date of Issue: 27 JULY 2021
(Valid for 3 years from the date of issue)

Legionella Control International Ltd

Legionella Control Association

Appendix 3 – Schematic Drawings

Schematic drawings were not included in the scope of the risk assessment. Schematic drawings for the domestic water systems should be maintained for reference to all water systems in the buildings on site.